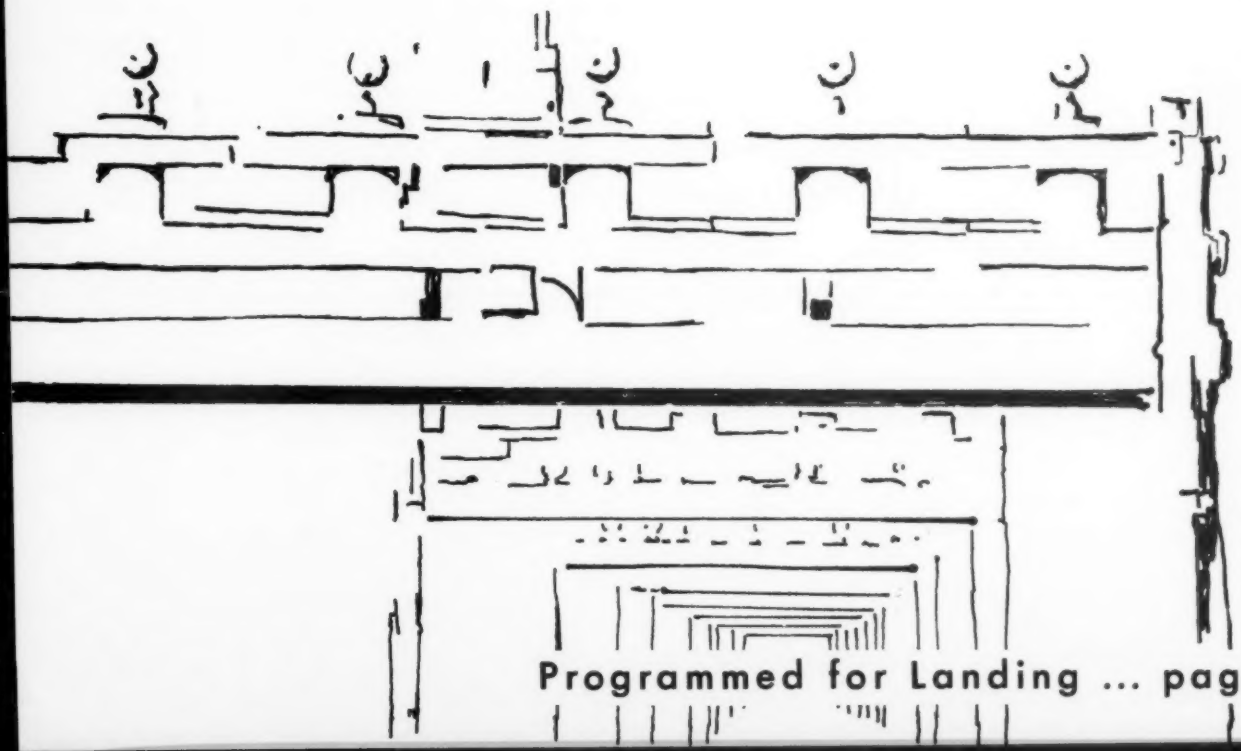
The MAC Flyer

FEBRUARY 1978



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in MAC Air Operations

The MAC Flyer

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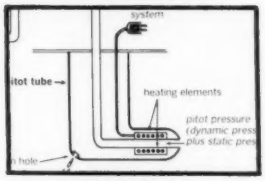

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Have a Safe Flight

On 1 February, Col Emery J. Crane retired after nearly 30 years of service. MAC's Director of Safety since July 1974, he shares some insights gained during those years at the request of The MAC Flyer.

The dichotomy of "the thrill of victory and the agony of defeat" probably best describes my three and a half years as the command's Director of Safety. Looking back, the victories fortunately outnumber the defeats—but in this business the defeats always get more attention.

We've undergone a lot of changes in those three-plus years; two big ones were the number of aircraft in the fleet and the number of people in the command. While other forces were being drawn down, MAC was growing. In 1974 we had 75,000 people in the family and 660 aircraft. Today we number nearly 90,000 people and more than 1,000 flying machines. And our gained Air Reserve Forces add another 400 aircraft to our wartime capability.

But even while going through the growing pains, we've had successes—several of them. Our flight accident rate has steadily declined from 1.4 accidents per 100,000 hours in 1974 to 0.8 in 1976. And though the final statistics haven't been tabulated for 1977, all indicators suggest that we've done well. I think we can all be justifiably proud of these figures.

Our successes have not been without accompanying failures. In 1977 we had two crewmembers killed in flight accidents though their aircraft were not damaged.

Yet, the failures which stand out the most have to be the fatal aircraft accidents. Getting that phone call telling you that an aircraft is down has got to be the emptiest of feelings. And I've gotten those calls—on four C-141's, two C-5's, a C-130, and several helicopters.

In nearly every accident, the thing that consistently stands out is the chain of events leading to the final tragedy. The acts, failures, omissions, and phenomena that combine to produce an accident: radar failure, a long crew duty day, an erroneous clearance.

And how does an outdated part with known problems get returned to stock and installed on an aircraft? How does an inspection of aircraft for suspect parts fail to turn up the fact that the faulty part has been installed?

I've pointed out a few examples of the "chain." In most cases, the elimination of only one link would have prevented the accident. Is there a message here for us?

It would seem that our equipment and environment is usually tolerant of one human error—but that tolerance diminishes rapidly with a second and third mistake.

There's an old cliche about human beings and accidents on the order of "Where you find one, you'll find the other." I am enough of a realist to agree that to err is human and that the elimination of all accidents is not a realistic goal. However, I am enough of an optimist to think that a goal of zero flight fatalities within MAC is attainable.

The way to attain this goal is for each individual to think of himself as the person who is going to break that chain of events which so consistently precedes an accident.

Have a safe flight.

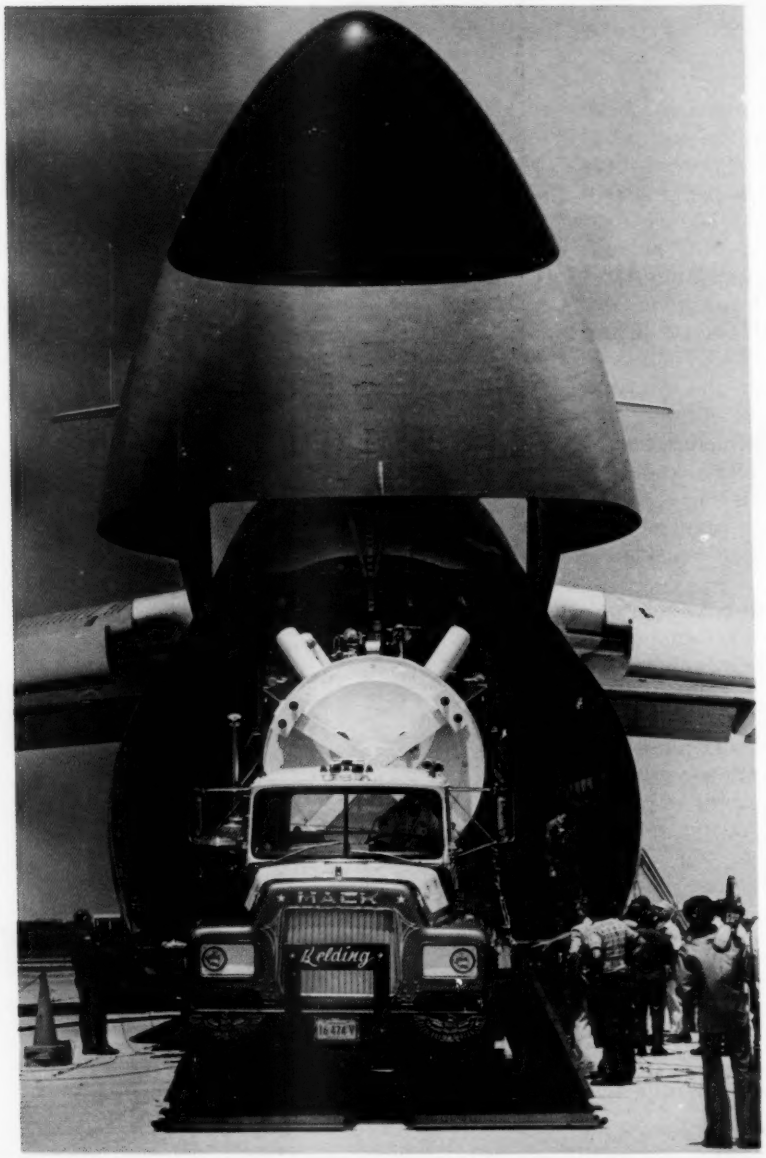
Col Emery J. Crane
Director of Safety

When the Galaxy lifted off for the long run to Moscow, the crew didn't expect the trip to be routine. It wasn't.

Special Delivery for Moscow

(second of two parts)

by Capt John M. Zinkievich
9 MAS
Dover AFB, Delaware



LAST MONTH: Mission planning, the flight to Chicago, and onload of the supermagnet went smoothly. But on takeoff from Chicago, the right aft main gear refused to retract. The AC directed the procedure normally used to solve the same problem in the simulator. It didn't work.

Dave then directed the landing gear in-flight troubleshooting procedures—no success. Flying the O'Hare Common Departure to South Bend, he now asked for the alternate main landing gear retraction procedures. Still nothing. We asked for and received clearance to level off at 10,000 feet. Our chief flight engineer, Senior Master Sergeant Beck, had been with the initial Air Force C-5 cadre at Lockheed and Edwards AFB. He conferred with Dave about a way to circumvent the problem, and they decided to employ a unique procedure that should successfully retract the gear and also permit extension of the gear at Moscow. It should be stressed that the high level of visibility, the diplomatic importance, and the ever-critical need of fuel to complete the mission warranted the utilization of an

improvised procedure. It's one of those decisions that we get paid for. Now with the gear up and locked, Bob Murdock requested continued climb to FL 250.

After leveloff at altitude, we began preparation for the first aerial refueling. Since takeoff I had monitored our HF radio for possible traffic from MAC, and we received our first word shortly after reaching altitude. The weather on the first track was getting worse and we had been given an extension of 150 nm on the track. Bob Murdock and I flipped a coin to see which of us would get the day-heavy in the weather or the night-heavy on the next aerial refueling. The coin said I would make the rendezvous with the first cell of tankers and transfer fuel from number three and lead. Captain Sprinkel would be in the right seat and take the fuel from number two tanker. Bob would sit in the jump seat and monitor the radios and give the post-aerial-refueling report to MAC. The planned fuel onload was to be 107,000 pounds, and our final disconnect from the boom would be at our maximum airborne weight of 712,500 pounds. One factor that had to be considered was our radar, which had been fixed in Chicago but was acting up again. The navigator now had it turned off, saving it for the rendezvous and weather avoidance.

As we approached Pike, the air refueling initial point (ARIP), Capt Pete Jones gave us the bad word that the stabilization was inoperative and both the X and K band radars were useless. As we passed Pike we descended to FL 230 per our ALTRV (altitude reservation) and Pete, utilizing the air-to-air tacan, performed an alternate rendezvous. The

We would be coming off the boom at maximum weight.

rendezvous was uneventful; however, we could see the weather down the track was going to give us problems. Refueling from the first two tankers out of Bangor was normal except for a few heading changes (lead tanker was performing weather avoidance). As we began our closure on the third tanker, both aircraft entered cirrus and cumulus clouds. We not only lost visual contact, but the radar was inoperative and the tacan kept breaking lock. By comparing speeds and headings and maintaining a 1,000-foot vertical separation, we both continued. With a simultaneous break in the weather and tacan lock-on, we spotted the lead tanker at four miles in the two o'clock position. Our airspeed was immediatley increased to 300 knots to quicken the closure. Though at one-half mile separation both aircraft were again engulfed by the clouds, visual contact could be maintained. As I kept flying to the precontact position, my nemesis, vertigo, started to plague me and it would continue until disconnect. Though I felt as though both airplanes were in a constant 90-degree climb, my main thought was to spend minimum time on the boom, so I continually inched the throttles forward, trimmed, and transferred the fuel. The refueling and disconnect were completed in the weather and with chop.

The weather thinned out as we continued with our visual deviations to avoid buildups. Over the North Atlantic we lost our primary navigational computer and had to use the alternate computer. We continually updated our flight plan weather with Ramstein Air Base, and the Russian radio operator used the HF to get weather updates for Russia and the Moscow area. There was no significant weather from the British Isles to Moscow, but there was the possibility of ground fog at Sheremetyevo. The total fuel onload of 113,000 pounds would have to be taken during our second aerial refueling to insure making our alternate of Alborg in Denmark should our destination be zero-zero.

The AR for the second aerial refueling track was at 56N13W, just west of Scotland; the AR would be accomplished at night. And to add to the difficulty of this heavy night refueling our formating altitude would be 3,500 feet above the desired altitude. Lieutenant Surman performed an alternate rendezvous at FL 250 with the cell of two tankers out of Mildenhall. Dave Sprinkel made the closure with the second tanker and the fuel transfer, but he was finding it difficult staying in the refueling envelope—at heavy weight and high altitude he could get just about enough power for the corrections. The problem worsened as Bob Murdock made contact with lead tanker. Now Albert weighed 60,000 more pounds and was 1,000 feet higher. At times Bob could not get enough power to remain in the envelope and keep contact with the boom. Again and again Bob brought the C-5 in until the total fuel was taken from the lead tanker. Despite the fact that it was a perfectly clear and smooth night, it was a torturous experience for Dave and Bob.

With problem three now out of the way, everybody sighed; we knew we would make it to Moscow. We continued flying the flight plan across Scottish, Danish, and Swedish airspace. As we approached Russian airspace at 20 East our Russian navigator and radio operator came up from the courier compartment to provide assistance. The navigator had his own charts and followed our route on them, and the radio operator maintained a listening watch on the radios. He gave us a conversion table of meters to feet which proved to be a great timesaver. It was daylight when we entered Russian airspace at an altitude of 9,000 meters, just 16 minutes behind our flight plan—the result of the gear problem and our difficulties on the refueling tracks. We had approximately one hour and 15 minutes before we would begin our approach into Sheremetyevo and it looked good for an arrival before 0500Z. We continued inbound to Moscow, flying the airways with the navigational aids of VOR and ADF. Soviet ATC controllers spoke English. The Russian radio operator obtained Moscow weather for us; it was CAVOK, and we could expect the ILS to runway 07L. He also briefed the approach, taxiing, and parking.

The Galaxy began to draw a crowd as soon as it blocked in.

At 0410Z we began our descent into Moscow, after receiving clearance to 7,200 meters; leveloffs were at 3,900, 3,600 and 1,500 meters. We received the QFE altimeter setting in millibars and, as in Europe, used the enroute supplement to convert to inches.

Moscow radar handed us off to Sheremetyevo radar and we began the before-landing checklist. We watched the right aft main gear intently as Sergeant Beck used our alternate "procedure." The gear came down and rotated but only to 20 degrees instead of the zero degree position; the MLG-bogie-emergency-positioning switch solved that problem. We then requested radar vectors to lose altitude since we had been cleared for the ILS above the glide slope. The controller readily obliged and brought us down to midfield with a left rectangular pattern to re-intercept the glide slope at intercept altitude. At 0450Z, 20 June 1977, C-5 90018 settled onto the runway at Sheremetyevo to become the first C-5 to land in the Union of Soviet Socialist Republics. We were to learn later that we had also made aviation history in that this was the longest flight to carry such a load.

Our Russian radio operator guided us on our taxi route, and as we blocked in we began to draw a crowd. Sergeant Beck deplaned to inspect the right aft gear to confirm there would be no problem with kneeling the aircraft; as expected, everything was normal. Chief Euscher started kneeling the aircraft and preparing the cargo for download. With that accomplished, the kneeling crew came back on the aircraft as the customs officials came through. Once we had been inspected, the official greetings took place. Captain Sprinkel was greeted by United States Ambassador Malcolm Toon and various dignitaries from the Soviet Institute for High Temperatures.

The loading ramps were set up by the loadmasters and shoring was placed on the ramps. The time and patience spent in Chicago paid off now, for it took only seven minutes to get the magnet down the ramp. It was with a real feeling of pride and

downright patriotism that we watched that brilliant red, white, and blue tractor-trailer and magnet roll down the ramp in the morning sun and drive off. Now the crew had to take care of the postflight duties, but as we turned around we saw our bags being taken to a waiting bus. A quick inquiry relieved us; this was our crew bus and on board were two female guides who would escort us while we were in Moscow. It took approximately two hours to download the aircraft, refuel it, and give it a postflight inspection. We changed into sport coats and ties aboard the aircraft and proceeded to the bus and a full day of new sights.

The airport was approximately 16 miles north of Moscow, and as we drove in on the expressway our guides gave us our itinerary. First we would get a tour of this city of 10 million people, then check in at the Rossiya Hotel, go to a "Beriozka" shop to get gifts and souvenirs, and proceed to the Institute of High Temperatures to attend a reception. As we passed through the countryside into the city we saw small farms with garden plots. Crossing the Circular Motorway brought us into the outer limits of this city of 340 square miles. Traffic was light with respect to cities like Frankfurt, London, or New York. Noticeably absent were neon lights, signs, shopping centers, and commercial activity. Then we stopped at Red Square and the Cathedral of St. Basil the Blessed built by Ivan the Terrible. We could see the Lenin Mausoleum of red and black polished stone and lines of people waiting to see the preserved body.

From the Lenin Hills we had a panoramic view of Moscow; just across the river was the Central Lenin Stadium (capacity of 100,000), and the site for the 1980 Olympics.

The two and a half hour tour was now over, and we proceeded back into the city and the Rossiya Hotel. We were all bone weary but arrived to find that our rooms were not ready. While our tour guides and the assistant air attache worked out the problem, the crew got a surge of adrenalin and made our way to the "Beriozka" shop on the other side of this, Europe's largest hotel. Like a typical MAC crew we bought something of everything. The prized Russian vodka and caviar, lacquered jewelry boxes, dolls and wooden toys, and pewter were among the popular items. After cleaning up, we again formed up on the bus and headed for the Institute for High Temperatures. Unfortunately the delay in getting our rooms caused us to miss the formal toasting, but on our arrival we were warmly greeted with toasts, handshakes, and smiles and invited to eat and drink. We sampled the dark Russian bread, smoked sturgeon, and sausage and tasted Russian beer, white wine, and ice cold vodka. But what impressed us most was the sincerity of the members of the institute and their continued thanks for having brought the magnet in such a "great airplane." We were further honored when Aleksandr Y. Sheindlin, head of the institute, personally gave us a tour of the U-25 pilot plant, the largest such facility in the world. It was here that we saw the superconducting magnet already bolted into the bypass test loop that had been constructed to accommodate it. This was the completion of our mission.

The following morning we had breakfast at the United States Embassy in Moscow prior to going out to Sheremetyevo Airport. On the way to the airport a representative of the Institute again expressed thanks for delivering the magnet.

This trip was a once-in-a-lifetime mission, and individually everyone gave 150 percent. Not only did we accomplish a safe and punctual delivery of the magnet with a few firsts, but we demonstrated to the world the capability and effectiveness of both the C-5 and the strategic airlift of the Military Airlift Command.

ABOUT THE AUTHOR

Captain Zinkievich, a native of Massachusetts, entered the Air Force in 1967 through ROTC. After completing pilot training in 1968, he was assigned to Bien Hoa AB, Vietnam, where he accumulated 77 combat missions and 340 hours in the AC-47. His next assignment was to T-29's at Mather AFB, California. He remained there while he upgraded to wing instructor pilot, took over as OIC of the T-29 Engineering Ground School, and pulled a rated supplement tour as commander of the Headquarters Squadron Section. While at Mather, Captain Zinkievich was selected to appear in the 1973 edition of "Outstanding Young Men of America." He is now a C-5 aircraft commander with the additional duty of senior controller at the Dover command post.

Promise Her Anything ...

but give her a C.R. Terror T-shirt.

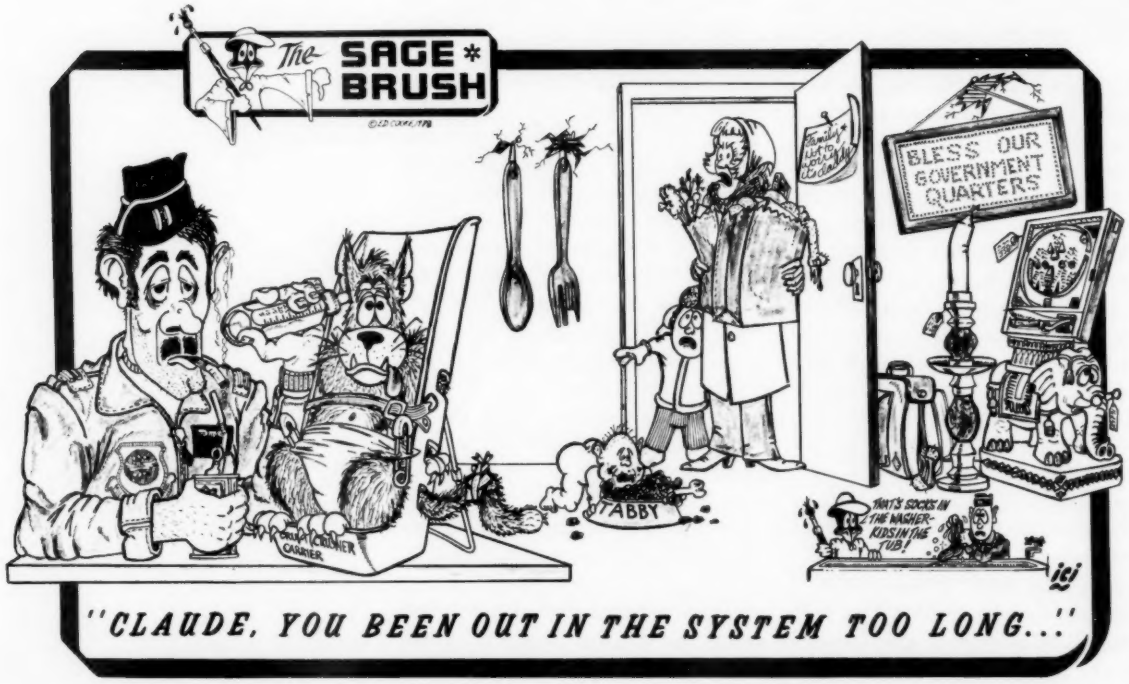
Lt Janice Warnecke of the Scott AFB Medical Center, and her C.R. Terror T-shirt. The owner of the British racing machine is unidentified.

We can't promise you a ride in C.R.'s British Racing Machine, but we can promise you a T-shirt with the Bold One's countenance prominently displayed on the, ah, er, front for all to see. "Aha," you say, "there must be a gimmick—there's no such thing as a free lunch—and what group of idiots would give away a high quality, handsome, collector's item such as the C.R. Terror T-shirt?" I'll tell you what group—the staff of *The MAC Flyer*.

And there is a little bit of a "catch:" you've got to tell us a story. That should be easy—we've heard you tell lots of stories before. This time, write it down—the one that has a flying safety message—and send us two copies, typed and double spaced. Identify your story by title only and on the cover sheet, identify yourself—you know, name, rank, etc. Be sure and include a brief bio on yourself and a military address and phone number if you have one. Your tale can take on nearly any form—poetry, prose, or whatever. It should be between 1,000 and 3,000 words (about 6 to 14 typewritten pages) long. Package up your award winning treatise and send it to:

The MAC Flying Safety Writing Contest
HQ MAC/IGFE
Scott AFB, IL 62225

Contest? That's right. And that means winners. So besides that fantastic T-shirt offer, you can win a prize. Walnut desk sets will be awarded the top three winners and plaques will go to the honorable mentions. Winning stories will appear in the world's finest fly-safe pub *(TMF)* with your byline. Hurry—the contest ends 31 March 1978, so your manuscript must be postmarked by then. You've got less than two months, so get with it.



Honorable Mention, 1977 MAC Flying Safety Writing Contest

Fail-Safe?

by Capt Terry R. Lowe
63 MAW
Norton AFB, California

A science-fiction look at flying safety, 1998 style.

The mission command pilot typed the flight planning data into the computer, waited five seconds for the customary lights and beeps, and picked up the three printed copies and the cassette tape from the slot at the bottom. Quickly scanning the printout, Captain Sharky verified the information.

```
MISSION IDENTIFIER:  MILITARY AEROSPACE
                     TRANSPORTATION SYSTEM
                     (MATS) FLIGHT 792.
MISSION TYPE:  CHANNEL CARGO/PASSENGER.
AEROSPACE VEHICLE (AV):  C-500.
TAKEOFF WEIGHT:  4.632 X 10^6 KILOGRAMS.
POINT OF DEPARTURE:  VANDENBERG AFB, CA.
DESTINATION: ARMSTRONG LUNAR SPACE PORT.
ENROUTE TIME:  3.447 DAYS.
VALID:  11 FEB 1998.
LAUNCH WINDOW:
   14.24 TO 15.17 UNIVERSAL STD TIME.
```

The weather was good, with only light turbulence forecast for the atmospheric portion of the flight. Sharky selected another switch to signal the computer that the flight plan was accepted. Then he and his crew sat down and suffered through the command post's video-taped predeparture briefing that they had heard so many times before Finally, the green light at the end of the room illuminated and the door opened, permitting them to leave the room.

Captain Sharky handed the flight plan to the navigator. "Well, Colonel T., how much per diem are we going to make on this trip?" Lieutenant Colonel Trumbelli reflected slowly on his 40,000-plus hours of flying time and answered, "About 90 New Dollars, I guess." His years of off-again, on-again navigational duties in MATS and the old MAC had taught him that the more things change, the more they seemed to be the same.

The pilot, Lieutenant Hamm, was already into his second Lunar Burger by the time the rest of the crew sat down in the snack bar. "Got to drink up on milk," he said between mouthfuls. "That powdered stuff on the moon is really rotgut!" The systems engineer and the loadmaster exchanged glances and shrugged.

Master Sergeant Edwards, the veteran of many hours at the panel, silently ate his food, thinking of the Dash Six preflight ahead of him that morning. Running a systems analysis by computer was sure easier than checking for hydraulic leaks in the rain. But somehow the charm of the "good old days" was lacking. Maybe it was the impersonal way the AFTO Form 781 was signed off by the computer with a HAVE A GOOD FLIGHT.

Sergeant White, on the other hand, was eagerly looking forward to the flight. He was still intrigued by the spaciousness of the C-500, despite its austerity compared to a commercial AV. And the responsibility of up to a hundred passengers for days at a time was a challenge he enjoyed.

"Well, guys, it sounds like a typical lunar mission," said Captain Sharky. "A cargo module, 42 duty pax, and two space-A space-hikers. The beast is in pretty good shape, except for a minor writeup on the number three engine. The computer gives an ETIC of 1415, so we'll shoot for a 1445 go. Any questions?"

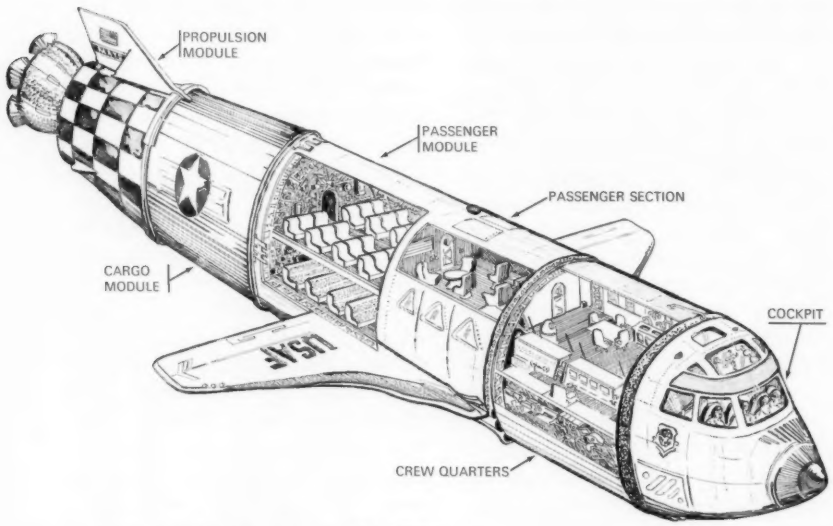
After finishing their meal, the crew caught the tram to pad 18A.

Preflight, loading, and bag drag activities were completed on schedule and the AV was in commission by 0710 local. The passengers were brought out. The crew strapped themselves in and rolled the checklist right on time. At precisely 1445 UST, well within the launch window, the engines smoothly lifted the grey and white aerospace vehicle into the bright morning sun.

The C-500, pride of Lockheed Aerospace Technology Division, consisted of four basic sections. The Propulsion Module contained the nuclear reactor, the plutonium fuel, four swivel engines, and associated protective shielding. The Cargo Modules were interchangeable con-

tainerized cargo/passenger configurations, complete with separate life support systems. Two of these modules were piggy-backed for this particular mission. The Command Module housed the cockpit, crew living quarters, and a small passenger section.

Everything aboard the C-500 was computerized. Standard routes had been programmed into the cassette tape mission plans, although the navigator could enter manual inputs if required. The Automatic Logic-Biased En Route Director (ALBERD) monitored all AV functions and subsystems. ALBERD displayed continuous position and systems information alpha-numerically and holographically, verbally recommended crew actions for normal and emergency situations, and automatically took certain critical emergency steps. ALBERD also maintained a continuous data link with the Flight Record Data computer (FRED) in the MATS central command post at Scott.



Orbital entry proceeded normally and at 1615 FRED gave ALBERD a green light for TLI (Trans-Lunar Injection). The pulsing of the nuclear drive could be felt throughout the C-500 as it accelerated to escape velocity. The engines were reduced to standby power for the coast into lunar space. ALBERD announced to the crew that the cruise check had been completed and they settled into their routine. The mission commander went back to visit the passengers, the systems engineer plugged his portable videodata monitor into the computer terminal in the crew quarters, and the navigator took hourly earth shots to verify ALBERD's selected course.

Lieutenant Hamm munched a high protein space lunch bar as he monitored the AV's position and performance displays.

As the hours went by, the earth grew steadily smaller behind them and the half moon seemed to move toward them. The crew occupied themselves by reading their flight manuals, playing cards, or sleeping. Even the few highpowered commercial radio stations had faded quickly and the AFRTS lunar station, in operation for only a few hours a day, was not yet on the air.

In the middle of the second day, just past ETP, it happened—so fast that the first indication was the low-pressurization warning horn and the brightening of the module lights. A baseball-sized meteorite—a one in a million chance—had penetrated the passenger module!

The crew initiated emergency procedures, connecting to their life support packs and checking in on the wireless intercom. The loadmaster quickly assured the cockpit crew that all passengers were on their emergency support packs and that he was directing them forward to the small passenger section of the command module.

At Scott, FRED, ALBERD's terrestrial counterpart, alerted the duty controller and automatically initiated a continuous video-voice data exchange (Conference Earthlink). By the time the crew had everyone safely accounted for up front, ALBERD had pinpointed the damaged area as the primary life support pack for the passenger module. A complete description and graphical depiction of all ALBERD knew about the problem was already available on the video screens in the cockpit and the information was communicated to FRED. The nitrogen-oxygen flow had ceased immediately, but cabin debris had plugged the hole sufficiently so that the decompression had not been instantaneous. While the systems engineer donned emergency EVA (extra-vehicular activity) equipment to assess the extent of damage to the surface of the C-500, FRED helped the MATS life support experts and the Lockheed technical representative analyze the problem on the ground. ALBERD calculated that the command module alone

was only capable of providing adequate life support to the 49 crewmembers and passengers for an additional 13 hours. The Command Post had launched the moon alert Aerospace Rescue Service AV, but linkup would require a minimum of 22 hours!

The systems engineer reported from outside the AV that the hole caused by the meteorite was small enough to patch, but that the life support pack was damaged beyond repair. In any case, without NOX to resupply the module, the question of repairing it seemed academic.

The brains of Conference Earthlink couldn't come up with anything. The life support pack in the passenger module was out of commission and the smaller system in the command module was unable to support that large a number of people. As the hours ticked on, the situation became more tense. The loadmaster and the mission commander had to use all of their reasoning and authority to control the uneasy passengers.

One slim possibility existed to avert disaster. The crew had patched the meteorite hole while they were waiting and had found a potential way to repressurize the passenger module. Sergeant Edwards would go back into the rear module with EVA equipment on, activate the cargo life support pack, and then transfer air into the passenger module. However, the computer was recommending against it. ALBERD reminded the crew that the command module would lose over one-third of its life support capability when the pressurization hatch to the near-vacuum in the passenger module was opened. So if the cargo module's normally dormant life support pack would not operate properly, the people on board would have only seven hours left to breathe!

Finally the crew decided that this was their only chance and informed the command post of their decision. "Roger, good luck" came the last words from the ground. FRED's message was less hopeful: CALCULATED PROBABILITY OF SUCCESS IS 0.0966.

Sergeant White assured that the passengers in the front module were strapped in tightly with emergency support packs in place. Sergeant Edwards donned his EVA equipment and exchanged a "thumbs up" with the rest of the crew, then moved towards the pressurization hatch leading to the vacated passenger module. With only a moment's hesitation, he activated the hatch, was pulled through by the onrushing air, and quickly resecured the entrance.

Pushing debris aside, he made his way to the pax module life support pack to check the repair job he had done on the outside a few hours before. Then he continued to the rear and the pressurization hatch separating him from the cargo module. It seemed in good shape and he pressed expectantly on the control valve. The hatch opened; the cold dark module seemed to draw him in. Flashlight in hand, he moved some of the smaller pieces of cargo back into the passenger module. His heavy breathing was due more to anxiety than to his efforts to float the cargo through the hatch.

Finally, he was able to create a pathway to the life support pack. He quickly checked the quantity and pressure of the system, then activated the flow valves. But nothing happened!

"No dice, guys," he transmitted up to the cockpit. "This pack hasn't been used in so long it must be frozen."

Captain Sharky's voice was first to pierce the silence, "Isn't there a thermal cutoff for that system someplace?"

"You're right," Sergeant Edwards transmitted, "I just forgot in my hurry back here!"

He located the unit behind a panel, reset the thermal switch, and once more activated the flow valves.

This time the green "flow" light illuminated and the engineer joined the cockpit crewmembers in a shout of triumph. The valves were opened fully and soon the cabin pressure began to rise in the cargo module. After 15 minutes ALBERD announced the passenger module was safe for human habitation. The repair to the fuselage was holding.

"Command Post," transmitted Captain Sharky, "tell FRED we're going to make it!"

ABOUT THE AUTHOR

Captain Lowe is a 1970 graduate of the University of Virginia where he received his Air Force commission through the ROTC program. He won his pilot's wings at Williams AFB, Arizona, in 1971 and flew EB-57's with the Aerospace Defense Command until 1974. Captain Lowe won third place in the 1975 writing contest and was selected as the 1975 MAC Additional Duty Safety Officer of the Year. He is currently flying C-141's and is a flying safety officer with the 63 MAW.

Pitot-Static Pitfalls

SUBJECT: MAC AIRCRAFT INCIDENT PRELIMINARY/FINAL REPORT, C-141A
AFTER DEPARTURE FROM RAMSTEIN AB, GE, PASSING FL 250, THE ELEVATOR-FEEL-MALFUNCTION LIGHT ILLUMINATED, FOLLOWED BY PILOT'S AIRSPEED INDICATOR INCREASING TO MAXIMUM VALUE. OVERSPEED WARNING HORN SOUNDED. AIRCRAFT WAS LEVELED AT FL 290. COPILOT'S AIRSPEED/MACH INDICATOR FROZE MOMENTARILY THEN DECREASED TO ZERO. NAVIGATOR'S TAS INDICATOR READ OFF-SCALE HIGH WITH CADC NO. 1 SELECTED AND 100 KTAS WITH CADC NO. 2 SELECTED. CRUISE EPR WAS SET AND AN EMERGENCY DECLARED. POWER WAS REDUCED SLIGHTLY AND DESCENT BEGUN. DURING DESCENT (APPROX 15 MIN AFTER INITIAL LEVELOFF) BOTH CADC-INOP LIGHTS ILLUMINATED. A RETURN TO RAMSTEIN WAS INITIATED. SHORTLY AFTER LEVELOFF AT FL 150, BOTH CADC-INOP LIGHTS WENT OUT AND NORMAL AIRSPEED INDICATIONS RETURNED. A CHASE AIRCRAFT WAS VECTORED TO AN INTERCEPT AND AIRSPEED INDICATIONS WERE VERIFIED. AIRCRAFT DIVERTED TO RHEIN-MAIN; APPROACH AND LANDING WERE UNEVENTFUL. FINDINGS: ALL ELECTRONIC PARTS OF THE CADC CHECKED GOOD. WATER WAS FOUND IN THE PITOT-STATIC SYSTEM.

This crew wasn't fooled by erroneous pitot-static information; they followed emergency procedures and recovered the airplane safely. But many highly-experienced aviators have been deceived by pitot-static problems. To refresh you on pitot-static principles and problems, here's an article by TWA's Captain Barry Schiff, adapted from Flight Safety Foundation's Pilot Safety Exchange Bulletin.

Are your altimeters giving you static? Here's a quick refresher on the pitot principle.

A spectacular example of [a pitot-static malfunction causing] an accident occurred in 1974 when a Boeing 727 was being ferried from New York's JFK to Buffalo, New York. Although the aircraft was cleared to FL 310, the ill-fated jetliner never reached its assigned altitude. At 24,800 feet, the trijet entered a spin and crashed only 83 seconds later (average rate of descent was more than 17,000 fpm).

Investigators used voice and flight data recorders recovered from the wreckage to determine that the disaster was caused by a simple, yet lethal, overdose of pitot icing. And if a professional airline crew flying an elaborately equipped aircraft can fall victim to such a terminal fate, then so can military crews flying similar machines.

The 727 pilots were deceived by erroneous airspeed indications. Because of ice-clogged pitot probes, both airspeed indicators behaved like altimeters and responded only to changes in altitude. During the climb, the IAS increased steadily. This urged the pilots to raise the nose even higher in an attempt to arrest what appeared to be a dangerously fast airspeed. This caused an increasing climb rate which compounded the problem. As altitude increased, so did indicated airspeed. The pilots continued to raise the nose until they unwittingly forced the aircraft into a stall.

There are three lessons to be learned from this accident:

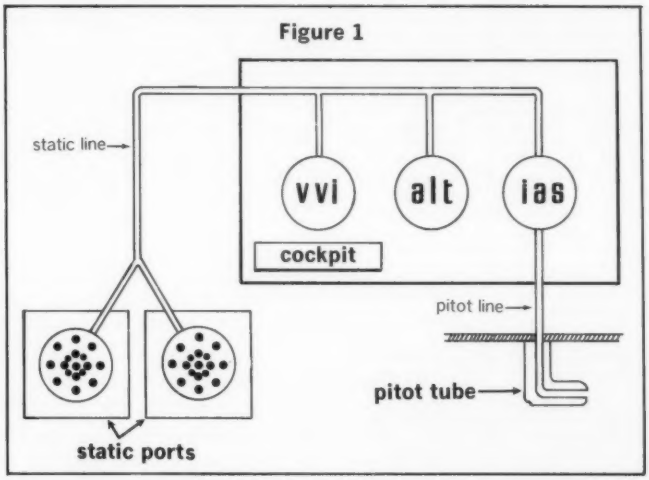
- Always adhere diligently to appropriate checklists. (The 727 crew failed to turn on the pitot heat even though this item was high on their taxi checklist.)
- When various instruments disagree, initially believe the one that indicates the most adverse condition. (Apparently, both attitude indicators in the 727 worked properly at all times and showed the dangerous 30-degree pitch angle prior to the stall.)
- Distrust instruments that indicate performance beyond the capability of the aircraft. (Near the top of the 727's climb, the pitot-static instruments indicated airspeed of 340 knots with a climb rate of 5,000 feet per minute.)

We shouldn't be too quick to criticize the 727 crew for not recognizing their problem. Contradictory instruments can be totally bewildering. During later experiments in a simulator, several professional pilots were subjected to similar flight conditions and instrument indications. More than half of them fixated on the erroneous airspeed indicator while ignoring the properly functioning artificial horizon.

Surprised? You shouldn't be. When a pilot takes his first flying lesson, he begins to develop the deep-seated habit of observing and reacting to airspeed indications. The IAS gauge becomes his primary key to survival. Later he is introduced to the artificial horizon, a relatively complex device that is more subject to mechanical failure than the simpler airspeed indicator. It is little wonder that—in a pinch—pilots revert to airspeed.

Figure 1 is a diagram of the pitot-static system typical of most general aviation aircraft. Its purpose is to provide *static* air pressure to the altimeter, vertical velocity indicator (VVI) and airspeed indicator; it also provides *pitot* pressure (dynamic pressure) to the airspeed indicator.

A similar system feeds information to the Central Air Data Computer. If the pitot-static system malfunctions, the CADC will not give accurate readings.—Ed



Blocked Static Source

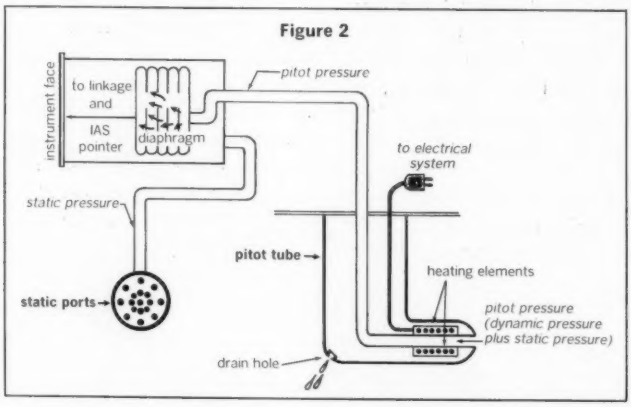
Totally blocked static sources are extremely hazardous. Without an altimeter, how can a pilot execute an IFR approach, maintain an assigned altitude or keep clear of the terrain?

The most obvious solution is to use an alternate static source. If the aircraft has an emergency static source, the use of pitot-static instruments may be regained by flipping a switch or turning a valve. If not, another way of getting static pressure is to break the seal on an instrument using static pressure. Since the air pressure in an unpressurized cabin is nearly the same as the ambient air outside the aircraft, this restores reasonable accuracy to the pitot-static instruments.

These instruments, however, will not be quite as accurate as when the normal static source is used because ambient pressure in the cabin varies slightly with airspeed, attitude and the position of ventilation controls.

Many crewmembers contend that if icing conditions are so severe as to clog up the normally ice-free static sources then unusually heavy structural icing would have created an earlier emergency. This is not always true because static sources are subject to other more insidious forms of obstruction.

Figure 2 is a simplified diagram of the airspeed system and is useful in analyzing IAS errors resulting from partially or fully blocked pitot-static sources.



Blocked Pitot Source

When ram air enters the pitot tube, it flows into a sealed diaphragm within the airspeed indicator housing. The expansion and contraction of this diaphragm causes the airspeed needle to move *(on a direct-reading airspeed indicator—Ed)*.

If an airplane is in a steady climb when the pitot tube freezes over, the air in the diaphragm is trapped. As the climb continues the static pressure around the diaphragm

decreases and the diaphragm expands causing a higher IAS. Conversely, during descent without pitot pressure, the static pressure increases, the diaphragm is compressed and the airspeed indicates lower. In this manner, the airspeed indicator behaves like an altimeter. This was the problem encountered by the 727 crew.

Unless the static source of the airplane is located on the pitot probe an iced over pitot does not affect altimeter and VVI indications. But if the static system is not clear the IAS is affected, even if the pitot tube is operating properly. When the static ports are blocked the static pressure surrounding the diaphragm in the airspeed indicator will not decrease as it should when the airplane climbs and the airspeed indicates lower than it should. During descent the airspeed will indicate falsely high under these conditions.

When a pitot or static source becomes impaired, the instruments can present a bewildering display of flight data. The best preparation for such an emergency is to understand the system and know how to interpret its messages.

SUBJECT: FLIGHT INCIDENT, HIGH ACCIDENT POTENTIAL (HAP), FINAL REPORT, C-130E. THE AIRCRAFT DEPARTED ELMENDORF IN FORMATION FOR AN ARMY AIRDROP. DURING CLIMB THE COPILOT NOTICED HIS AIRSPEED INDICATOR WAS DECREASING TO ZERO AND HIS ALTIMETER HAD STOPPED AT 900 FT MSL. PASSING 3,500 FT MSL THE COPILOT'S ALTIMETER BEGAN INCREASING AGAIN ALTHOUGH THE INDICATIONS WERE ABOUT 3,500 FT LOW. INDICATIONS ON NAVIGATOR'S TAS INDICATOR AND ALTIMETER WERE ALSO ERRONEOUSLY LOW. AFTER LEVEL OFF AT FL 180 THE PILOT HAD DIFFICULTY MAINTAINING FORMATION POSITION AND SUSPECTED AN AIRSPEED INDICATOR MALFUNCTION. HE DECLARED AN EMERGENCY AND STARTED A DESCENT IN VISUAL CONDITIONS TO ELMENDORF. DURING LEVEL OFF AT 4,000 FT THE PILOT'S ALTIMETER AND VVI LAGGED EXCESSIVELY; IT WAS ONE TO TWO MINUTES BEFORE THE VVI SHOWED LEVEL FLIGHT. THEN THEY FLEW A FORMATION ILS APPROACH WITH ANOTHER C-130. ON FINAL APPROACH THE PILOT'S INDICATED AIRSPEED WAS 164 KNOTS AS OPPOSED TO THE 135 KNOT FINAL APPROACH SPEED BEING FLOWN BY THE OTHER C-130. AFTER LANDING THE COPILOT'S AND NAVIGATOR'S ALTIMETERS READ 10,900 FT MSL AND SLOWLY DECREASED TO FIELD ELEVATION IN 15 MINUTES. FINDINGS: DIRT IN BOTH STATIC SYSTEMS. THE PRESENCE OF DIRT AND POSSIBLY MOISTURE CAUSED PARTIAL BLOCKAGE OF BOTH STATIC SYSTEMS LEADING TO ERRONEOUS INSTRUMENT INDICATIONS.

SA-16 Albatross

The Grumman Albatross began life in 1947 as the answer to a Navy requirement for a utility aircraft which could operate from land, water, or snow. Nearly 300 of these airplanes also found a home with the Air Force's Air Rescue Service, where their designation was eventually changed to HU-16. Often referred to as "Dumbo," the versatile amphibian saw action in both Korea and Vietnam before its retirement in 1973. The SA-16B was powered by a pair of Wright R-1820 nine-cylinder radial engines developing a total of 2,850 horsepower at takeoff. It cruised at 150 knots; top speed was around 205. The

Albatross's max gross weight of 36,000 pounds could include eight passengers or 13 litter patients and enough fuel for a range of over 2,000 nautical miles. Its 97-foot wingspan and low stalling speed allowed it to land in only 2,200 feet over a 50-foot obstacle, an asset which contributed to over 1,000 rescues from coastal waters and rivers during the Korean Conflict. On 7 July 1973, the last HU-16B in the operational inventory set an altitude record for twin-engine amphibians of 32,883 feet—not bad for a "low and slow" airplane.

Mishap with a Moral

"... contact departure. So long."

Long, the runway.
Long, the day.
Long, the swath where the wreckage lay.

The planners scheduled three aircraft (a primary and two spares) from different units to support a joint-service exercise. One of the obligations fell to a squadron operating four-engine jet transports. With only skimpy information available about the details of the operation, the squadron supervisors viewed the mission as "nothing special" and scheduled a standby crew to cover the requirement.

BD Minus 25 Hours

The standby crew learned about the mission when they checked in at 0800 Tuesday. They were told to expect an afternoon launch for an exercise lasting a couple of days. The crew left the squadron and re-entered crew rest. Just after lunch time they were alerted. The crew planned and flew a short hop to a nearby Army airfield where the exercise was in progress, arriving about 1800 Tuesday evening.

A few hours later, they were informally briefed by the exercise operations director, who outlined their commitments for the next day. The crew was told to expect an afternoon departure for a base in the Southwest. There they would make a refueling stop, fly an orbit mission, and recover at another base. More details would

be provided at the next day's formal briefing.

Using the information provided so far, the crew went to base ops and did some preliminary planning. When these chores were completed they adjourned to their quarters for some crew rest. Tomorrow promised to be a long day.

Under exercise conditions the aircrew was billeted in an old alert building on the airfield, where the Army had provided cots and sleeping bags for the four or five men in each room. The noise of the exercise continued through the night just outside the billets; although there was adequate time for sleep, the crew was not well rested when they arose about 0800 on Wednesday.

Beginning of Duty (BD)

The crew reported for the formal briefing at 0900 only to be told that the exercise commander, who was to accompany them, wished to remain at the airfield as long as possible. The formal briefing and their departure would be delayed accordingly. The exercise planners also told the aviators they could expect to fly one of four different mission options; the final choice would be made at the formal briefing. There were no flight planners available, so that duty fell to the aircrew.

The crew spent the next five hours flight planning a complete mission profile for each of the four options. The mission options included seven takeoffs, departures, arrivals, and landings; 11 different cruise segments; and four different orbit times. Along with flight planning, the crew mixed light snacks and a couple of trips to the aircraft to check on minor maintenance.

BD + 5 Hrs 45 Min

At the afternoon briefing the crew was informed that option four would be used. It called for an evening departure for a western base to pick up a backup exercise team, then a short flight to another base to onload fuel and demineralized water (the Enroute Supplement noted that water was not available at the first base), and finally, an orbit mission with recovery to another base in the Southwest. The AC mentioned the long crew duty day to the operations director. The director stated that the exercise commander had waiver authority, leading the crew to believe that appropriate waivers had been obtained. The AC didn't call back to his home unit to check, but pressed on with final flight planning for their evening departure.

BD + 10 Hrs 28 Min

The mission departed the Army airfield with the exercise commander and the primary control team. Enroute the crew called their destination base ops and found that demineralized water *was* available. Initially, they had determined that critical field length at the high pressure altitude would restrict the aircraft to a relatively light takeoff weight. Now, the additional thrust provided by water injection would allow them to carry more fuel, eliminate a hop to the other air base, and still fulfill the desired orbit time. But in their preoccupation with critical field length the crew apparently overlooked another vital factor: the effect of the gross weight and pressure altitude on the aircraft's climb capability.

BD + 14 Hrs 6 Min

It was dark when the big jet touched down at the western base. Transient maintenance troops marshalled the bird to a parking spot and started servicing. The crew went into base ops to revise the flight plan and check weather.

BD + 15 Hrs 7 Min

The pilot called ground control on the base ops telephone:

"... I just landed ... awhile back but we're going to be taking off. We're heavy out here... and I was wondering what the winds were. One zero's still the active, right?"

"Yeah," ground control responded. "Winds about one fifty at, uh, four knots. ... You can use two eight, if you want."

"Uh, let's see. I'm trying to figure out whether that's a

headwind or tailwind," the AC answered. And then later, "That will be a little bit of tailwind for two eight . . . . " After rechecking his computations, the AC told ground, "Okay, that's actually a little bit of a headwind."

"Well, for one zero it would be."

"Okay . . . . would it bug you guys if we did request two eight?" the pilot asked. "I don't think we'll have to if it stays one five but . . . . "

" . . . no problem," ground responded. "Whatever runway you want you can have. . . . In fact, some of the heavier aircraft take two eight because it's kind of downhill. When you get out there . . . you can take the one of your choice."

"Okay," the AC replied, "we'd like to take off with a headwind and I guess that'd be one zero, right?"

"Yeah, right now . . . . "

The crew, concerned about critical field length for the heavy weight takeoff, computed the data carefully. They apparently didn't perceive the importance of the maps displayed in base ops showing the sharply rising terrain to the east.

The crew milled around base ops, grabbed a few snacks, and groused to some other flyers about their long day. The pilot said he was tired and really wasn't looking forward to their next mission—a seven hour and 30 minute orbit.

Half an hour later, the crew was at the aircraft. There was some problem—demineralized water—just couldn't get enough of the stuff. But finally, several trucks and 30 minutes later, they were ready.

BD + 16 Hrs 33 Min

The pilot transmitted to ground control, " . . . [we're] starting engines."

" . . . roger, advise ready to taxi."

BD + 16 Hrs 37 Min

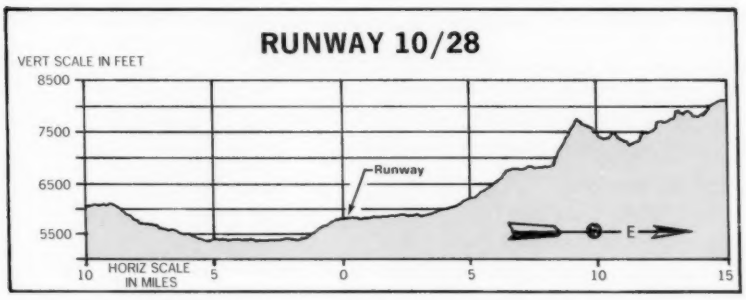
" . . . ground, [we're ready to] taxi."

" . . . taxi to runway one zero . . . the wind one four zero at four."

BD + 16 Hrs 42 Min

Tower cleared the multijet into position on the runway to hold.

"Ah, ground," the crew transmitted, " . . . can we go down another couple hundred feet to get the full use of the runway . . . ?"



They apparently didn't perceive the importance of the display in base ops depicting sharply rising terrain to the east.

"Okay . . . . "

The crew questioned the controller to make sure they were using all the runway available. Once they were satisfied, control called:

" . . . you are aware of the high terrain . . . that's just east of [the field]?"

"That's affirmative . . . . "

Tower: " . . . whenever you are ready you are cleared for takeoff. Advise when you start your roll."

Aircraft: " . . . about to roll."

BD + 16 Hrs 46 Min

Tower: " . . . contact departure. So long."

The aircraft contacted departure and called airborne.

" . . . climb and maintain one six thousand," departure advised.

No response.

A call on guard.

No response.

BD + 16 Hrs 48 Min

Voices on hotline: "You see a fire . . . ?"

"Affirm. That's what I said. He went in."

"Ring out all the equipment."

"Yeah, ring 'em out."

This accident became inevitable when the four-engine jet reached "go" speed. The aircraft's gross weight combined with the pressure altitude made the terrain off the departure end of the runway insurmountable. The aircraft, with all systems operating normally, impacted a ridge less than five miles from the end of the runway and slightly more than 1,000 feet above field elevation. There were no survivors.

by Capt Bruce L. Gumble
Associate Editor

If you can't remember the last time you made a no-notice missed approach, be careful. You may be . . .

Programmed for Landing

The accident investigation board was interviewing the captain of an ill-fated commercial airliner. The aircraft had made a long touchdown on a short runway and eventually smashed into buildings and automobiles off the departure end, killing 37 crew and passengers. Why, the investigators wanted to know, hadn't the captain gone around when he realized the landing was long?

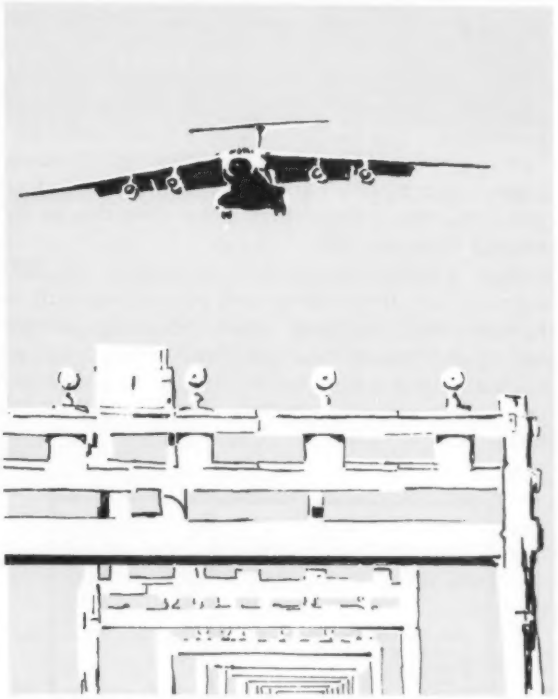
"Well," the captain replied, "I am sort of programmed for landing. I am oriented to landing."

It's no surprise that, after thousands of successful approaches and landings, experienced pilots develop a great degree of landing expectancy. Actual missed approaches, though rare, are more often dictated by ATC because of conflicting traffic than initiated by the pilot. The result can be a mental "set" in which a missed approach is the farthest thing from the pilot's mind. Add a few adverse factors like bad weather, an unstabilized approach, wind shear, dangerous terrain, and a difficult missed approach procedure, and the potential for an accident multiplies dramatically.

Pilots aren't the only people affected by landing expectancy. If an uneventful landing every six hours or so builds complacency in an aviator's mind, what about the air traffic controller who may see *hundreds* of "no sweat" landings in the same period of time? Several recent hazard reports indicate that arrival and departure controllers sometimes apply separation standards that are adequate—unless the landing aircraft makes a missed approach. Then, with the aircraft on the go rapidly overtaking the one on departure, a potential mid-air situation can develop within seconds.

There are other factors besides experience which may "program" a pilot to land. Who hasn't experienced a sense of relief after breaking out of the crud at the bottom of a hairy approach and seeing the runway lights dead ahead? That runway represents security and the end of a tough job; going around would mean boring back into the murk and trying again, or maybe heading for an alternate you hadn't planned on using—by way of some Victor airway and navaids that you'd never heard of before.

Pride can rear its ugly head on short final, too. You may have heard someone brag about going five years without a missed approach—but have you ever heard somebody talk about the approach he should have abandoned, but didn't? If you've ever engaged in a yank-and-bank exercise to salvage a lousy lineup on final, you've got plenty of company; nobody likes an unsuccessful approach. Of course, an unsuccessful landing is worse.



Since landing expectancy is so subtly conditioned into all of us, it's probably not possible to eradicate it. After all, if we didn't expect to make a normal landing on nearly every approach, we wouldn't be in this business. But there are some things we can do to keep landing expectancy from becoming a fatal affliction.

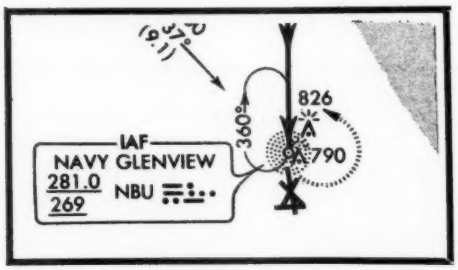
1. *Fly the approach to touchdown.* The transition from instrument to visual flight is one of the most dangerous traps for the unwary. Once that familiar runway environment is in sight, you're wide open for inadvertent duck-under, visual illu-

sions, and other short-final "gotchas." So after you heave that sigh of relief, go back to cross-checking airspeed, glide slope, VASI, radar altitude, or anything else you can use to make sure the last part of the approach isn't turning into a swampful of alligators.

2. *Look for surprises.* Once "landing is assured," as the Dash One so comfortingly says, look around to see if it really is. Is there traffic on the runway which may or may not get off in time? Are you sure you're cleared to land? Is there a possibility of wind shear? Is the runway really "in sight," or is there low-lying scud that might block your view as you get lower? Last but not least, is the approach really good enough to land out of, or would it be smarter to try it again?

3. *Be ready for a missed approach.* Naturally you briefed missed approach procedures, but that was quite awhile ago; take a second to remember the first critical part of the procedure (e.g., runway heading to 2,000). And by the way—if that briefing was a simple "missed approach will be as published," you can be leaving yourself open for a nasty surprise. We all know that a lot of instrument approaches are designed by sadistic geniuses; don't forget that those guys design the missed approach, too.

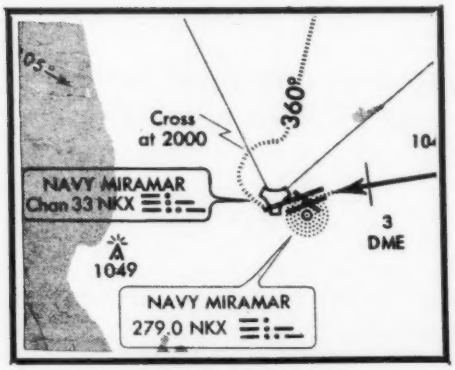
Here's an example: you're making an NDB approach in the weather and you're planning on having the navigator read you the missed approach instructions if you don't break out. Sure enough, there's nothing in sight at the MAP but murk. The missed approach procedure looks like this:



MISSED APPROACH
Over NDB turn left climbing to 2500 and enter holding pattern

Think it looks easy? Imagine yourself on the go in a C-5 in night weather, trying to figure out on the spot which way to get into that holding pattern.

Or how about this classic?



*** MISSED APPROACH**
2.0 DME before TACAN climb to 1500 on 240°, when abeam TACAN turn right to 360°, cross R-320 at 2000, intercept 13 DME Arc at or above 4000, proceed to RAMON Fix at 5000.

If you like being busy, you're gonna love this one. And according to Murphy's Law, you'll probably have to fly it with a broken autopilot (or none at all), in moderate turbulence, and with a tacan that won't lock on inside three miles.

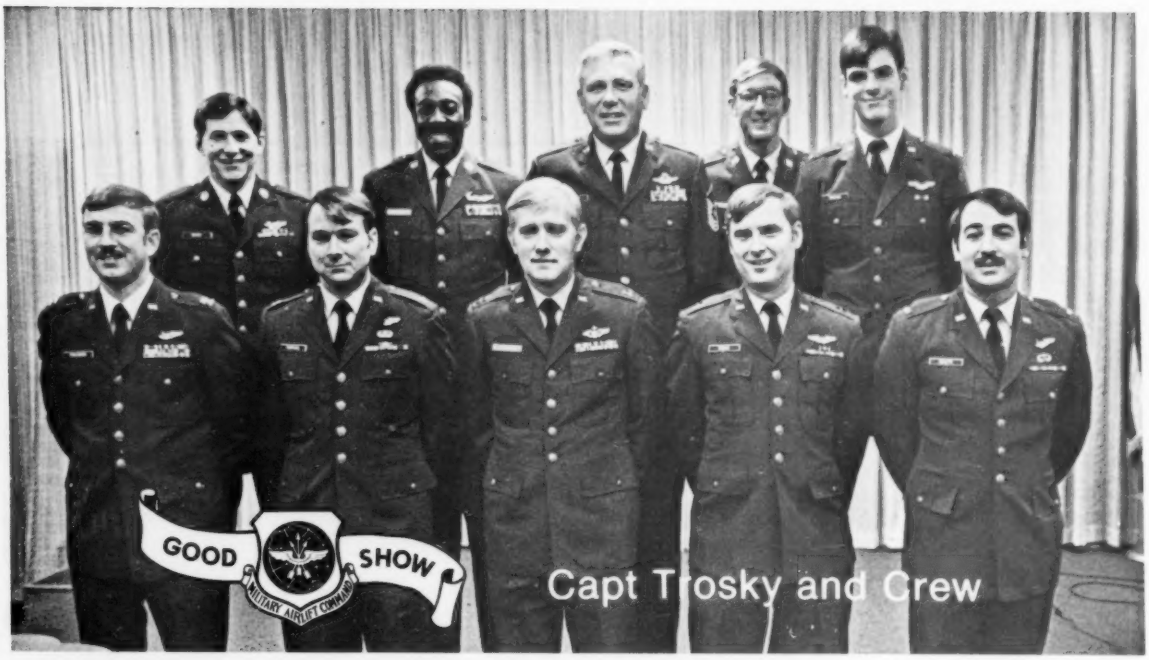
If you think we're picking on the Navy, take a look at this jewel from one of our own MAC bases:

**** MISSED APPROACH**
Upon passing MAP (GXU VORTAC or 1.0 DME GXU) climb to 3000 on GXU R-360 to intcp RBV R-235 to RBV. Thence RBV R-122 to intcp CYN R-042 direct to CYN. Hold at CYN or for DME equipped acft, turn left at 12 DME when inbd to CYN, heading 160°. Proceed to 9 DME fix CYN R-080 and hold.

Naturally, this one only applies when the local Victor airways are full of airliners, Center's radar is out, and Command Post is calling to ask your intentions.

Sure, none of these missed approach procedures are beyond the skill of MAC's steely-eyed aviators. But when you're not expecting a missed approach at all, let alone a *published* missed approach, trying to stay ahead of the airplane can be the toughest game in town.

We said earlier that it probably isn't possible to eradicate landing expectancy, since a normal landing at destination is the whole purpose of the mission. But maybe if we temper it with a little "go-around expectancy," none of us will ever be in the shoes of the captain who was "programmed for landing."



SSgt	MSgt	SMSgt	SSgt	1st Lt
Robert E. Wright, Jr.	Roosevelt Williams	James A. Copeland	Karl S. Freienmuth	Israel S. Yarchun
Capt	Capt	Capt	Capt	1st Lt
Ronald Pregmon	James W. Thompkins	Robert T. Brown	Chester J. Trosky, Jr.	James E. Colotta

On 31 October 1977 Capt Chester J. Trosky, Jr. and his crew, all from the 53 MAS, Norton AFB, California, departed Richmond RAAF, Australia, on an airlift mission to Alice Springs. The Starlifter had just reached 700 feet AGL when number three engine exploded. A turbine disc in the engine disintegrated, sending pieces of the turbine into the number four engine, which also failed; another chunk of hot metal sliced through the fuselage, setting fire to a pallet of cargo.

The loss of thrust on two engines and the high gross weight of the aircraft produced a rapid drop in airspeed; at one point, the 141 was struggling to stay airborne just above rotation speed. Captain Trosky assumed control of the aircraft, began a shallow turn to follow a river valley, firewalled the throttles, and slowly began retracting the flaps to reduce drag. Gradually the airspeed and altitude began to increase, finally stabilizing at about 200 knots and 1,000 feet AGL. Captain Pregmon, the jump seat occupant, reported that the number three engine was on fire and that both engines on the right side showed heavy damage.

Meanwhile the other crewmembers began fighting the cargo fire, coordinating between the cargo compartment and flight deck, and assisting the two passengers with their oxygen masks. The back of the aircraft filled with smoke rapidly; one crewmember estimated that visibility got as low as three to five feet. Donning smoke masks, the crew formed a human chain, passing oxygen bottles and fire extinguishers back to the area of the fire.

Smoke began to fill the cockpit as Capt Trosky carefully maneuvered the aircraft for a VFR emergency return to Richmond. At first, the crew's efforts to eliminate the smoke had little effect; but finally Lieutenant Colotta opened the sextant port and much of the smoke dissipated.

The crew's rapid, purposeful activity continued as Captain Trosky completed the approach and landing. Using spoilers and maximum antiskid braking, he stopped the burning aircraft on the runway, shut down the engines, and directed evacuation. Less than ten minutes after takeoff, the crew and passengers were back on the ground, uninjured. RAAF firefighters extinguished the flames.

For their courage, skill, and superb crew coordination each of the crewmembers was awarded the Air Medal in ceremonies at Norton. *The MAC Flyer* would like to add its traditional "Good Show"—as well as a heartfelt "Wow!"

Robert Gray AAF

Fort Hood, Texas

*(day-zha-voo), [Fr., lit., already seen], the illusion that one has previously had a given experience.

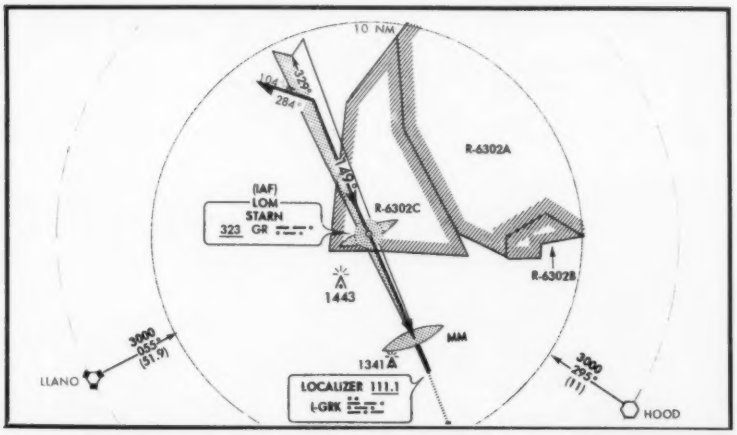
Located in the moderately rolling terrain of central Texas about 45 miles north of Austin, Robert Gray Army Airfield has a single 10,000-foot runway (15/33). The runway bisects two long, low, east-west ridges; terrain rises 150 feet above field elevation within 900 feet of centerline. ASR and PAR approaches are available to either runway; there is also a VOR approach with circling minimums only and an ILS to runway 15. There is no VASI.

There are numerous restricted areas north of the field—the closest, less than five miles from the departure end of runway 33. The major hazard of flying into Robert Gray is the intensive VFR lightplane and helicopter operations in the area. The majority of the helicopters fly low-level missions at 200 feet AGL and below. Most are camouflaged, many have minimum markings, and all are extremely difficult to see.

Helicopters are also a problem in the vicinity of the runway, where they normally use both the infield grass area and the parallel taxiway for takeoffs, approaches, and landings.

The IFR Supp cautions airmen to watch for deer in the vicinity of the runway.

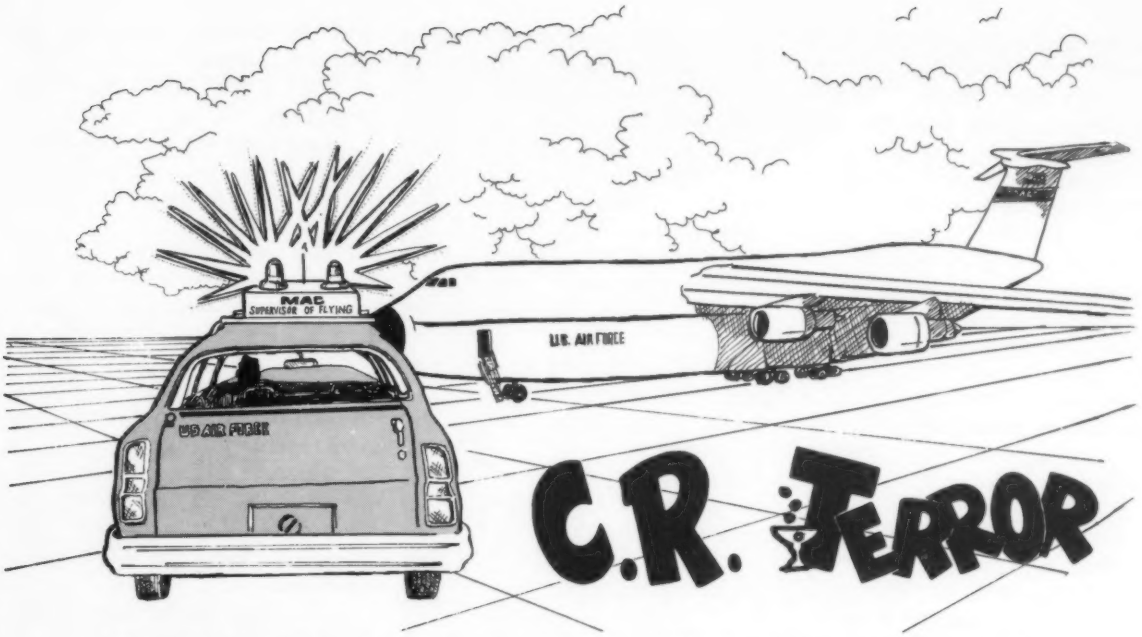
—Adapted from ISD-Q6-459



There are several restricted areas to the north.

On final for runway 33.

Runway 15 has an ILS but no VASI.



The Master Manipulator unintentionally invites two generals to a wing-ding.

"Rule, Britannia," the Boisterous Baritone warbled as he lightly stepped aboard the crew bus. "I say, chaps, we're off to merry old England, eh what?" he said with his best pseudo-British accent.

"The weatherman wasn't so 'merry' about the rain at Kelly or the snow at Dover," reminded Blinky.

"Tut, tut, m'boy, they're merely en route stops on our way to London Town tomorrow." The Global Gourmet smacked his lips in anticipation. "I can just taste the Beefeater's and London broil now."

A check with Sergeants Torque and Downs showed that the C-5 was properly fueled, loaded, and released. The flight deck crew ascended to their lofty positions and Sergeant Eaper, second engineer, put on his headset and went down the crew entrance steps to monitor the engine start.

The Rotund One extended the seat belt to fit his generous midriff. "Sammy, turn down the radios; I can't stand that incessant chatter."

With the radio volume at a whisper, the Great One and crew worked their way through the checklists. Sammy challenged, "Clear to start engines?"

"That's negative, sir," responded Sergeant Eaper. "There's a vehicle closing fast from your 11 o'clock—looks like the SOF."

The supervisory sedan screeched to a stop next to the Galaxy and a harried-looking captain bounded up the crew entrance steps. Out of breath, he arrived in the cockpit and gasped, "He's coming!"

"Who's coming?" asked the Ambient Aeronaut.

"General Rattler! Don't you guys listen to the radio? Command post has been calling you for 20 minutes."

"He's right; look out front." Sam pointed out a blue staff car speeding from the transient ramp toward the Galaxy. A two-star flag waved in the breeze on the right front fender.

The SOF quickly explained, "The general's 39 broke down so you'll be taking him to Dover. They were supposed to pick up another general at Kelly anyway, so everything works out just right." His smile betrayed a hint of pleasure at C.R.'s anxious expression.

The two-star briskly climbed the steps to the crew compartment, stopped suddenly, and stared at the Bulgy Bod.

"Terror! I never expected to see you in the left seat of an airlifter again! No matter, I'm already 15 minutes late, so let's get moving. We've got to pick up General Bullmoose at Kelly and get to Dover before midnight." Without waiting for an answer, he turned and marched

back to the courier compartment.

"He's right, Major," Sammy confirmed. "This note the SOF handed me says that we have a controlled block time at Kelly of 1820 local and 2340 local at Dover. Command post called base ops and gave them our DV code five."

"No sweat, number two," the Great One soothed, relieved that the general had departed the flight deck. "For a professional like myself, block time tolerances of five seconds are routine. Starting number one."

With 28 wheels securely tucked in the wells, Albert climbed smoothly into the California sky and headed southeast. The Able Aeronaut remained unusually alert during the entire climb and cruise. He attended to every detail of the mission with unusual care and an occasional nervous glance over his shoulder toward the courier compartment. But everything went smoothly, and C.R. became more and more relaxed the longer the general stayed away from the flight deck.

As the Galaxy crossed the Texas border Blinky informed the Ace of Airlifters, "We've had a pretty good tailwind for awhile, sir. We're running about 20 minutes ahead. Maybe we should revise our block time."

"Well, how 'bout that—our Magellan finally found us a tailwind instead of the usual 100 knots on the nose," teased C.R. "Sammy, tell 'em to get the red carpet ready early—Ruffles and Flourishes at precisely 1800 hours."

About a hundred miles out of San Antonio, Center offered an en route descent. C.R. accepted gratefully. "Looks like we've got it made," he boasted. "I'm sure the generals will recognize my superior skills in securing priority handling from the controllers."

Sammy interjected, "The Kelly ATIS says the weather is 500 overcast, one mile viz, rain, winds 110 at five, and six degrees; landing runway 15."

"Rumpy 77, contact San Antonio approach control on 353.3," instructed the Center controller.

"Tell 'em thanks for the good work and give me the approach book," the Great One commanded.

Sam handed over the book, switched the radios and called approach.

"Roger, Rumpy 77, radar contact, descend to and maintain 5,000," the controller directed. "You're cleared present position direct Wooze intersection, direct Curds, Victor 68 San Antonio, direct Kelly VOR, expect ILS to runway 15."

"Hold it, Sammy, don't roger that," preempted the Impatient Pilot. "Tell them I want vectors to the ILS; we've got DV's aboard."

The controller obliged with surprising cooperation: direct routing to Kelly VOR for the ILS and an apology because he thought Rumpy 77 was a flight of T-37's inbound to Randolph after Kelly.

"Looks like we'll just miss our block time, sir," Blinky surmised. "We'll be in at 1805 instead of 1800."

"Nonsense, m'lad, I'll just keep the speed up—with the great service we've been getting, we'll make it with ease."

C.R. held 250 KIAS while descending through several thousand feet of clouds and rain until reaching Kelly VOR.

"Rumpy 77, reduce to approach speed," directed the controller. "You're number two behind a Tango 37, 12 o'clock, six miles."

C.R. impatiently demanded, "Tell that Tinkertoy to get out of my way, approach. I've got a controlled block time and I'm running late."

"We tried to send him around, but he appears to have lost radios," explained the controller. "Turn right heading 250 for spacing."

C.R. banked the gray and white behemoth to the right. "We're still a little early, boss," Sammy reassured. "If we don't get vectored around too much we'll just make it."

After two more turns the Galaxy was vectored onto final approach. C.R.'s touchdown was unbelievably smooth on the rain-slick runway. He let the C-5 roll out the entire length of the 11,500-foot runway to reduce his taxi time.

"Rumpy 77, turn left at the end," Kelly tower transmitted, "then left on the parallel; the follow-me will assist."

The Able Aeronaut throttled the Galaxy onto the taxiway and picked up speed behind the truck. "How's the time,

Blinky?''

''It's 1758; looks like you'll just about make it.''

Ground control instructed, ''Rumpy 77, hold your position for a taxiing B-52.''

''We've got a controlled block time, ground. Could you please get that BUF to hold?'' Sammy pleaded.

The controller directed the bomber to stop and cleared the C-5 to taxi on.

''Thanks, ground,'' C.R. replied. ''We'll make it if this truck will speed up a bit.''

The follow-me driver pressed harder on the accelerator each time he saw the Galaxy's four nose tires filling his rearview mirror. The driver made two sharp right turns, intending to bring the jumbo jet's crew entrance door as close to the waiting staff car as legally possible. C.R. gave the order to caster the wheels and followed the truck as well as he could. He slipped a little wide on the turns due to the Galaxy's excessive speed. The truck stopped in front of the intended parking spot. One marshaller dismounted and ran to C.R.'s left to serve as wingwalker; the driver hopped out and positioned himself in front of the big transport.

The Galaxy staggered slightly as it came out of the second turn. ''Humphh, must have run over a chock,'' the Deft Driver observed calmly.

''Stop! Stop! I think we just hit a lamppost!'' Blinky shouted from his position just behind the AC's seat.

''Couldn't have; we've got a wingwatcher on that side. What time is it, Sammy?''

''Seventeen fifty-nine. Fifty seconds to go—we'll open the doors right on time.''

The Paragon of Punctuality turned to his left and gaped at a 60-foot-tall ramp light toppling toward a blue staff car.

Staring out the side window in disbelief, the Rotund One saw the driver helping a bulky figure out of the crushed sedan; neither appeared injured. Two men in white coveralls stood under the wingtip, gazing up in amazement.

The Bold One bolted from his seat. ''I'd better get out there and render some first aid!'' he shouted as he raced for the flight deck door.

General Bullmoose spotted C.R. as the Round One was about halfway down the crew entrance ladder. ''Oh, no—not Terror!'' he bellowed. ''This time I *will* dance at your FEB!''

The World's Finest tried to stop in mid-step and assume the position of attention. But the steps were wet with rain; losing his balance, the Acrobatic Aeronaut did a superb 9.6 one-and-half to the ramp.

C.R. recovered consciousness to observe the concerned faces of his crew staring down at him. ''You sure were lucky, Boss,'' Blinky remarked. ''You've been out for about an hour, but the doc says there's nothing seriously wrong. By the way, here's your watch; you must have lost it when you fell.''

C.R. stared at his now-inop Rolex Oyster Perpetual: 1800 straight up.

''Now, that's what I call a controlled block time,'' he muttered, and closed his eyes.

Quick Stoppers

Just an Inch Off

Close only counts in horseshoes and hand grenades. It has no place around aircraft where an inch on the altimeter can make a difference of 1,000 feet—always in the wrong direction.

Here's a case where a Starlifter, descending into a Greenland base, was given an altimeter setting of 29.83 by approach control. Certainly nothing unusual about that. "Descend to 3,300 feet." Okay.

Passing 7,300 feet, GCA picked up the MAC flight and again issued a setting of 29.83. Reinforcement. But as the heavy descended, tower and GCA got together on the altimeter. According to the weather sequence from the teletype, the QNH should've been 28.83. The tower controller had erroneously transcribed 29.83 on the sequence in heavy grease pencil—for ease of reading.

Once the error was discovered, the correct setting was given to the MAC crew and an uneventful landing was made. Think the crew would have caught the mistake? Wonder if they checked the 29.83 setting against the forecast?

Boomer *Gets* Gas

Eating habits? That's something we don't normally discuss. And, what with the cuisine offered at your friendly automated flight line snack bar, you might suspect that the flight surgeon *wants* you on a diet of chili and microwaved hamburgers (nonperishable). So, since most MAC aircrewmembers feel they have developed cast iron stomachs as a defense mechanism, here's a reminder of what an improper diet can do to you.

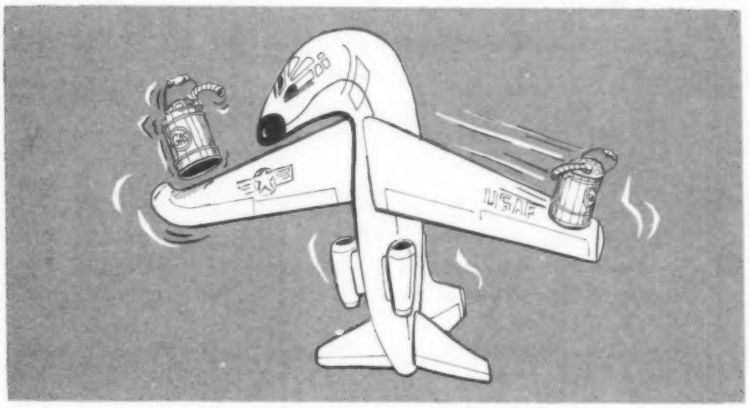
This particular aircrewmember did not have the best eating habits. He averaged one balanced meal per day during the three days preceding the flight. He'd had gastritis problems; the medicos had just given him a complete upper GI series but found nothing.

On the day of the flight, the boomer experienced slight stomach cramps upon awakening. He ate no breakfast. During the flight he consumed two hamburgers, two cartons of chocolate milk, two chocolate cupcakes, and some water. (Burp!) Then on top of that (literally), he assumed the prone position and went about his work. The lack of breakfast coupled with the hard-to-digest foods consumed in flight produced a large volume of stomach acid and gas. In the boom pod, with his back arched and the weight of the parachute pressing on his lunch, the boomer had great difficulty voiding the gaseous buildup.

When the pain became almost unbearable, he grabbed a motion sickness bag and followed the preprinted instructions. This action relieved his pain somewhat and he was able to leave the aircraft unassisted after landing.

The Fly Doc found gas—lots of it—and a prepyloric peptic ulcer. So the boomer was DNIF'ed and placed on diet therapy. If any of this sounds like you, maybe it's time for remedial eating training.

Balancing Act



The Sabreliner was climbing out of Old South AFB when its front seat occupants noticed a developing fuel imbalance. The pilots attempted to correct the problem using the crossfeed/tank select switch. No luck. Then, to make sure the valves were working, they tried all the switch positions. No problem there.

The next trick involved pulling the circuit breaker to the lightweight wing boost pump. But due to a misinterpretation of the Dash One, the crossfeed/tank select switch was left in the normal position, gravity-feeding the engine. At FL 305 the T-39's right engine flamed out. The pilot declared an emergency and descended to 25,000 feet where a successful airstart got things together again. Putting Mother Nature to work, the crew sideslipped the aircraft and gravity balanced the wing fuel loads. The pilots diverted to Nearby AFB and made an uneventful recovery.

Maintainers found that the right boost pump relay was defective and had denied the pilots the use of the crossfeed/tank select switch to correct the problem.

Even Though the Accident Did Not Occur

There are aviation units which have been operating for a long time without flight accidents. In these units, as a rule, the quality of the combat training is higher than it is in those units where flight safety is given less attention. Why is that? Because flying training has confirmed that pilots' achievement of high quality flying skill is inseparable from the struggle for accident-free flying operations. This is a two-part task. The successful execution of any flight depends to a large degree on the all-around preparedness of each specialist, strict adherence to the governing regulations, and the uninterrupted operation of the equipment. If the commander strictly evaluates the trainees' actions, this will permit him to record and methodically direct the training and education process with great effectiveness and prevent possible mistakes by the trainees in time.

Mistakes will happen, however. In one of the subunits, while examining the entries in a logbook listing the precursors to flight accidents, something caught my eye: the list was quite small. The squadron commander began to assure me that no other incidents had been observed. I had to remind the officer that there had been inspectors in the squadron the day before, that they were present during the flights and had observed a number of errors during the execution of the missions in the air.

The squadron commander had apparently wanted to embellish the operational record. Is this imaginary success at all helpful? If a pilot's error or a technician's shortcoming are not registered as precursors to flight accidents, it means that proper action is not being taken in this regard. Such an attitude toward error can lead to its repetition, and to more serious consequences.

—Extracted from an article by
Col Aleksandr Grigor'yevich Yarchuk,
Red Star

Qs

Sluggish Starlifter

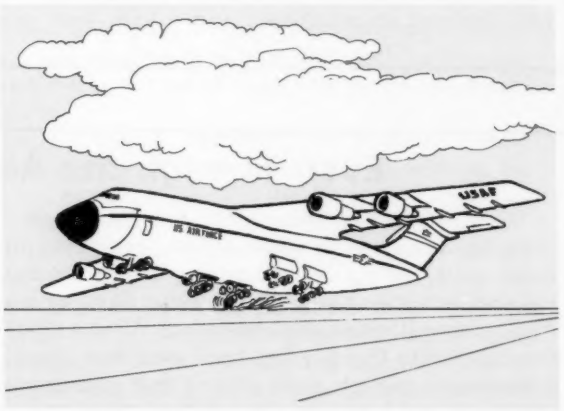
The TOLD called for rotation at 122 KIAS, but the Starlifter hugged the ground for a bit longer and finally flew off at 145 KIAS. The crew continued to the East Coast where they turned the C-141 over to another group of aviators for a continuing flight to Europe. Acceleration checks and takeoff by the second crew were normal and the airplane performed as expected en route to the Continent. Landing in the Netherlands the Starlifter offered this crew a hint of problems to come with a firm touchdown, but the crew attributed the poor quality of the landing to pilot technique.

Takeoff from the Low Countries was normal, and the MACmen cruised their empty airlifter to their final destination in Germany. When they tried to land the 141, its message was unmistakably clear: elevator control malfunction. Some good pilot technique resulted in only a firm touchdown and no damage to the unresponsive aircraft. The cause: a faulty elevator pack.

Jumbo Jitterbug

The C-5 was about 3,500 feet into its takeoff roll. IAS was 100 knots, about 18 knots below rotation speed. Suddenly the Galaxy pitched up two to three degrees, banked about five degrees to the right, and swerved five to ten degrees right of runway heading. The pilot reined in the fractious maxijet and aborted the takeoff. There was no damage, and all aircraft systems operated normally—so what had caused the momentary loss of control?

Investigators found that less than a minute before the incident, a Boeing 747 had landed on an intersecting runway. Apparently, the light winds allowed the 747's wingtip vortices to remain in the vicinity, where they eventually grabbed the Galaxy by the T-tail and shook it.



Notable Quote

We trained hard but it seemed that every time we were beginning to form up, we would be reorganized. I was to learn later in life that we tend to meet any new situation by reorganizing. And a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization.

Petronius Arbiter

after deadline . . .

STARLIFTER FIRE HAZARD--During taxi-in, the loadmaster spotted sparks, and then flames, coming from the right rear upper bulkhead. The crew extinguished the fire with an on-board extinguisher and removed all power from the venturi fan motor, which had overheated and seized. Investigators found that the aircraft's home unit had experienced 24 venturi fan failures in the last year.

NEVER ASSUME--When the CT-39 crew heard a loud bang from the back of their airplane and saw the cabin-press-fail light come on, they assumed that the passenger oxygen system had come on as advertised in the Dash One. It wasn't until a passenger developed hypoxia symptoms that they noticed the "golf club" lever was still in the closed position. Investigators found that the Dash One is wrong; the warning light and passenger oxygen system are operated by separate aneroids. There'll be more on this incident in a future issue.

RESCUERS NEED HELP--Here's a chance to return a favor for the guys who did so much for all of us in Southeast Asia. The 41 ARRS is looking for tapes of actual search and rescue (SAR) missions to use in a combat communications simulator. They'll copy your tape and return it immediately; if you don't want to lend your original, send a copy. You'll be reimbursed for shipping costs in either case. Send to:

Combat SAR Tapes
41 ARRS/DOXT
McClellan AFB, CA 95652

THE 1977 TALLY ISN'T COMPLETED, but it looks like MAC has gone through one of its safest years yet. We had no passenger fatalities, and the two aircrewmember deaths we suffered were not the result of aircraft crash or collision. This superb record is surely a tribute to skill, motivation, and professionalism. Congratulations--let's do it even better in 1978.

WANTED: SUPERVISING EDITOR for The MAC Flyer. Major or lieutenant colonel, pilot or navigator. Experience in C-5, tactical airlift, or helicopters is desirable. A background in journalism would be nice, as would a background in flying safety programs and safety awards. If you're interested, contact The Editor, The MAC Flyer, HQ MAC/IGFE, Scott AFB, IL 62225 or call (618) 256-3534 or Autovon 638-3534.

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